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Examinations, Reports, and Court Work.

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As you are aware, veterinary jurisprudence is not a subject laid down by the Royal College on which our students can be examined. At one college at least they are now receiving lectures on this subject, but in my time there was not the slightest hint given as to how one should act in cases of a legal character.

In the medical profession jurisprudence and forensic medicine are important subjects in a student's career, and to my mind the ordinary general practitioner in human medicine is less called upon to exercise this knowledge than is a general practitioner in our profession.

Certainly, we do not require in our work the deep and extensive knowledge of this subject expected from a specialist in the sister profession, but I believe that a few lectures dealing with examinations, reports, and court work would be of great assistance to a young practitioner.

While it is true that motor and electrical traction have displaced a large number of horses, it is also true that there has been a large increase in the number of accidents to animals on our streets and roads, and consequently an increased call on our services by owners or insurance companies.

When called upon to make an examination and report on an alleged injured animal, what steps should we take in carrying out this work? Personally I believe, if at all possible, it is better to make our examination with the veterinary surgeon in attendance present. I say this for two reasons: it tends to a better feeling between practitioners, and further I am pleased to state that I have frequently found that I have received a truer statement of the history of the case than I would have got from the claimant. Full notes should be taken to identify the animal, and all facts jotted down and ultimately included in the report, a copy of which should be kept; too full notes cannot be taken.

If from special circumstances it is not convenient or thought advisable to meet the surgeon in attendance, one should never interfere nor comment on the treatment to the owner of the animal. Personally I fail to see why in most cases we cannot meet; matters of fact we might agree on, matters of opinion we might differ on, and reserve those for the special benefit of our respective clients. It may be by meeting we agree, without prejudice, that in the interests of all concerned the animal should be destroyed to save expense, and in such a case I certainly think that this agreement should be confirmed in writing, more especially if the two practitioners have agreed also as to the value of the animal at the time of the accident.

Let me lay before you for your consideration the following case:—An animal had received a deep wound into the muscles of the hip, and after being stitched by the veterinary surgeon in attendance had not been seen again for a few days. Another practitioner was sent to examine the animal on behalf of an insurance company, and, after communicating with the surgeon in attendance, found he was to be from home at the proposed hour of inspection. On examination it was found that the wound was septic, and that the animal was highly fevered and seriously ill. There was no question as to what was the correct treatment—the stitches must be cut and drainage established; but who was to do this work? If left locked up as it was, the animal would probably die, and if the inspecting veterinary surgeon opened up the wound and, say, tetanus set in, what answer would he make to the charge that if he had left the wound alone there would have been less risk of infection? In this case it was arranged between practitioners, that the one in attendance should at once open up the wound—the correct and only safe legal attitude to take up.

Post-mortem examination should, if at all possible, be made conjointly. It may be that some extraordinary circumstances prevent all parties concerned being present when the carcase is opened, but the people who are present at this time should take care that all material is left for the late comers, and that the legs and head are left attached to the body, and the hide still attached to some portion of the animal. It has been known that where one party arrived after the animal had been cut up, the marks of identification did not correspond with those stated at the time of insurance, and the blame was laid on the slaughterhouse attendant for showing the wrong hide and head; quite a reasonable excuse in a busy slaughterhouse.

To take another case:—A cow is insured against death, but death from tuberculosis is excepted. Suppose that she dies from, say, internal hæmorrhage and the veterinary surgeon in attendance confirms this by a *post-mortem* examination. A day or two later a veterinary surgeon representing the insurance company calls to make an examination, but finds the animal so cut up that he is unable to detect the evidences of hæmorrhage, but finds tuberculosis present, and reports death due to the latter disease.

Now we are all aware that tuberculosis can be present to an alarming extent, and the animal live and show no evidence of the disease. In my opinion in such a case as this, if both parties had been present when the carcase was opened, there was every chance that they would have agreed that, while the animal was tuberculous, death was caused by internal hæmorrhage and not from tuberculosis.

These two cases clearly support the view I have stated, that all parties concerned should be present at the beginning of a *post-mortem* examination. I will now submit to you another matter that any one of us may have to decide for himself. Under what circumstances or conditions would one be justified in advising or ordering the destruction of an animal without the consent of the owner and with the veterinary surgeon present, acting in the owner's interests?

The first part of the answer to this query is, never order an animal to be destroyed, if you think it the correct attitude; merely advise the party who called you in, and leave the ordering to him.

The second part is, on what grounds should we advise immediate slaughter? In my opinion we would only be justified on the grounds of humanity. We are employed, for instance, by a railway company, to advise on what is to be done with an animal found in a horse-box, suffering from a compound fracture of the tibia. I feel certain that we are all likely to agree that we would advise immediate slaughter. But suppose the injury is in the region of the pastern and it is a question as to whether or not we have a fracture. In this latter case there may be no immediate need; it may be a matter of opinion as to whether there is a fracture or not, and whether the animal could not be repaired. Under the latter circumstances I should advise the bandaging of the injured part, the animal being removed in an ambulance and put into slings, then notify the owner, and await developments.

The Recent "Horn Case."

To illustrate the danger of acting without the consent of the owner, let me lay before you a case I was in recently.

The animal was a shorthorn bull, and after travelling all night was found to have lost a horn, when the truck was opened in the morning. He was then put on board a ship, and it was there I found him about the middle of the day, when I went to examine him on behalf of the railway company.

After making enquiries for the owner or his man, I found that they had gone up town. I then examined the bull and found that one horn core had lost its covering of horn and that at the tip of the horn there was a mass of clotted blood. After the blood was removed it was found that the tip of the horn core had been fractured and was hanging by a thread of tissue. Thinking that on the grounds of humanity, and in the best interests of all concerned, the correct treatment was to cut off this inch or so of fractured bone, I severed the tissue by which it was hanging, thus leaving a blunt tip, instead of a graceful tapered point.

In this case there was no question of interfering with another man's work, the ship was sailing in a few hours, and I thought I had exercised reasonable care and skill in acting as I did, but as the case develops you will find that that is a matter of opinion.

Fully a year afterwards the case came into court, and from my letter book I refreshed my memory, and found that I had reported that the tip of the horn core had been fractured and that I had removed blood clot and tip.

I will now place before you, word for word, the statement made on behalf of the owner, and on which he originally founded his claim, and I would be glad to have the opinions of my fellow members as to what line of treatment they would have adopted if consulted on the matter. It was stated that the outer case of a horn of one of the bulls had been knocked off; that the Company, without the authority of the owner, had the inner part of the horn removed; that the outer part of the horn might and should have been replaced and that it would have grown; that the value of the bull through the destruction of its horn (which would have been prevented if the Company had not unwarrantably intervened) was very considerably depreciated.

My answer to this statement is that I never saw the horn, which must have been lost many hours before in the cattle truck; that if the owner thought that the correct treatment was to stick the horn on again, then he could have either done so himself or employed professional skill to do so, and, further, to have replaced the horn, if it could have been found, would have been gross maltreatment, and would most likely have given rise to sepsis, with possibly serious results. However, if anyone had been rash enough to try this treatment, there was the certainty that it would have been knocked off against the woodwork of the narrow stall.

However, on arrival at Court I found the charge had become even more terrible, it being now alleged that I had sawn the core off, leaving about two inches of the stump, this is what I understand they meant in the original statement, viz., the Company had the inner part of the horn removed.

My reply to this statement is, that it would have been maltreatment to have done so, and that even if provided with a saw, which I was not, it was not an operation that could have been done without help.

I admitted in cross-examination that I had removed the tip, which was hanging by a thread of tissue, was cold, and covered by blood clot, but I would not admit that it would have been good surgery to have bandaged this fractured portion on to the stump. I was pressed and faced with the statement that the opposing veterinary surgeon had done it frequently, and that the owner and his herdman had seen it done successfully.

I further answered that the removal of the tip did not interfere with the growth of new horn, as the horn-secreting tissue lay, not at the tip, but at the root of the horn. If anyone present has any experience of bandaging and resetting successfully a fractured

tip, it would be interesting to hear the method employed, as the absence of protective tissue, such as horn or muscle, would in my opinion make union impossible, as in a partially fractured horn.

The Sheriff decided as follows: That the operation could not be justified on the grounds of humanity, that there may be cases where such grounds entitled a surgeon to assume the owner's consent, but here there was no immediate need. He further stated that he had evidence that it was possible to reset the broken piece of horn bone, and that if this had been done the bone would have adhered. To cut the strip of skin by which the bone hung was, on this occasion, to make such a result impossible, for it was through the periosteum that the bone was fed. He held that it was proved that there was at least a reasonable possibility that the bone might have been re-set in this way, and that was enough. Finally he said that it was not open to the party responsible for an unauthorised operation to contend that it had not been proved to be the best; that it was for him or them to prove that the unauthorised operation was the only one a sensible man could choose, and that had not been proved.

Now, weighing up the evidence fairly and squarely, could the Sheriff have decided otherwise? Personally, if I had been in his position and with no surgical knowledge, I would certainly have decided in favour of the parties who had reset fractured horn core tips successfully under similar conditions, and not for the side who had only negative evidence to give. The positive evidence in this case was based on fact—the successful result of previous efforts to bring about union; the evidence for the defence was merely based on general principles, and not from experience gained by failures under exactly similar circumstances.

Positive *v.* Negative Evidence.

The decision in this case brings to my mind previous cases, where the comparative value of positive evidence against negative evidence might be considered.

Take what is known as the Sweet Bloom filly case. The positive evidence here won the day against the negative, which stated that no ring-bones existed. The negative side, undoubtedly by critical analysis, attempted to prove that hardly two of the positive witnesses agreed as to the exact seats of the exostoses; but the positive evidence was accepted.

In a case of alleged arsenical poisoning, due to cattle eating of distillers' grains, the defender's (or negative) side had no notice of illness until the animals were dead, and *post-mortem* examination had been made by only the pursuer's (or positive) side present. There might have been great difficulty in breaking down the evidence here, but for two facts—firstly, that many other cows ate of the same stuff and none suffered; and secondly, that from the positive side's own chemist it was found that the quantity of arsenic present was so small, it would have taken six months before the animals could have partaken of an ordinary dose.

In other type of case, alleged sewage poisoning, I have only had one opportunity of seeing an alleged case in life. My earlier cases were stated to have suffered from abortion, diarrhœa, and to give milk of various colours. The positive evidence again won, as the pursuers clearly proved that their cattle were healthy until the contamination of the water began.

The last alleged case was alive when reported, and it was arranged in the event of death, or if the cow should be destroyed, that the defenders should be notified of the *post-mortem* examination. This was done, and it was found to be a case of Johne's disease, and the pursuer and his neighbour, who was also joining in, dropped the case.

We will now suppose that we are invited to a consultation with the agent in a case: what position are we to take up? Are we simply to let him lead us along and stuff us full of the evidence he wishes us to give, probably based on the information obtained from our mutual client? I should certainly say no, let the lawyer know how far you are prepared to go, and if your evidence is likely to be of little use, and more especially if harmful, then let him drop you. It is only fair that you should let your lawyer know in the privacy of his room, rather than in the witness box, that he has been leaning on a broken reed, or, what is worse, a hostile witness.

Having arrived at the witness box, the examination in chief is comparatively easy, provided the lawyer and witness have seen eye to eye in the preparation of the case. Then follows the cross-examination, and one must be prepared to answer a lawyer probably coached by a brother in the profession. In replying to the opposing agent I should advise short answers, as less likely to give him a chance of scoring a point against one. Certainly never be rude, flippant, or evasive. Acts such as these will bring the Bench into conflict with you and probably discredit your evidence. Never be afraid to admit an opinion or fact that is common knowledge, even if it tells against your own side; it is a pitiful sight to see a witness trying to evade a straight answer, because by doing so he may be yielding a point in favour of his opponent. The Bench knows the answer, and by hedging your evidence becomes discredited in their minds.

Lawyers as cross-examiners I would divide into three classes: the bully (now nearly all dead); if we should meet one, never answer in his manner, but rather quietly and firmly. The same manner of answering will do when replying to the "superior party," who is inclined to pity you and deride your evidence. The third type is of suave manner and frequently begins by apologising for troubling you, but explains that the reason he is asking you any questions is that there are one or two little points he would like cleared up. Watch this man, as to my mind he is a most capable cross-examiner, and will carry you on until he gets you to admit the point he was after, and having got that, thanks you and sits down.

We are told that our sins will find us out, this also applies to the witness box; as any errors of omission or commission made at the time of our examination become magnified and are used as pegs to hang an

argument on by the opposing lawyer, and as points why the case should be decided in favour of his client.

This brings me back to my original contention, that great care must be exercised at the examination, as an error made at the beginning probably never can be rectified, and cuts away the foundation of the case. Full details of all points of place, date and hour, parties present, full marks of recognition of subject or material, and many other items that look small at the time, should be put on record, and not left to the mercy of an ordinary memory. These full and copious notes may never be required, but if, many months afterwards, the case should come to court, you will feel strengthened and your memory refreshed, by again perusing a carefully taken record.

Discussion.

Principal Gaiger thanked Mr. Robb for his very able paper. In a great many cases the judge, not having the special knowledge required was not in a position to give a decision. In his opinion, in many of the sewage cases where damages had been awarded, this had been done erroneously, as the cause of loss in the light of present-day knowledge was undoubtedly infectious disease such as Johne's disease or contagious abortion. He would not like it to go out to the public that veterinary surgeons were the only professional witnesses who differed, as it was quite as pronounced and even more so in the medical profession. The trouble was that witnesses were apt to stretch a point to help their client. He was in a Court recently and heard a medical witness make a statement which was glaringly false, if he retained the slightest shred of his student-day knowledge.

Mr. Pottie (Greenock): Veterinary jurisprudence ought to be taught in the schools. I think there ought to be a veterinary assessor to help the judge. I have known of cattle horns being knocked off, but, the core remaining whole and the covering replaced immediately, to recover quite well. The horn is formed from the core. Referring to the "Sweet Bloom case," it was a question of one set of veterinary surgeons against another. On the question of obtaining the owner's consent to destruction, the police have certain powers—in any case it is our duty to protect such cases from further or unnecessary cruelty.

Mr. Reynard (Perth): I am pleased with Mr. Robb's paper. I was the witness on the other side in the horn case described by him. I have had no difficulty in cases like this in healing horn cores, if the core is set and bandaged and attached to the other horn. It is better to have both veterinary surgeons at a *post-mortem*, but better still to have a third. A case I was on once—a hackney mare—was put in a box on rail at Aberdeen and, on the owner having a last look at her before the train left, he found her dead.

Two veterinary surgeons at *post-mortem* certified death to be caused by inflammation of bowels. I made a *post-mortem* of the neck and found fracture of the second vertebra.

In Court work, make a plain, honest statement and there is no need to be afraid of any type of lawyer.

Mr. Bishop (Perth), after thanking Mr. Robb, said we should not set up medical evidence as our aim, as medical witnesses more often differed than veterinary. Positive evidence always had the pull over negative. Take the case of "Shivering, or stringhalt." Positive evidence said, "I saw the symptoms of the disease;" negative, "I did not see any symptoms of the disease;" and common sense gives the decision in favour of positive.

In the bull case I was asked to be a witness; and I was summoned. I called on the agent and told him I did not see the bull, but that the veterinary surgeon on the spot was the best witness. The horn needs to be put on immediately after the accident, and carefully and firmly secured. I agree with Mr. Robb in removing the fractured tip. Any fancy treatment would probably lead to the growth of a bastard horn. In the "Sweet Bloom case," I think the fact of the coronets being blistered led the judge to think that there must be something wrong.

Re examinations for soundness, veterinary surgeons often stretch a point to help a client who has bought a horse too dear or not pleasing him.

Mr. Laird (Kilmarnock), after thanking Mr. Robb, said that in the horn case he ought not to have touched the core at all. The fracture, if almost complete, would not unite. He preferred to keep clear of Court work if possible.

Mr. Roy (Glasgow) thanked Mr. Robb for a very able paper, and said: I have had not infrequently cases of fracture of the horn core which, if treated immediately, recover well. In Mr. Robb's case I think he did wrong to interfere. The man who makes the most successful witness is the one who has most experience of Court cases. I think we should avoid Court work as much as possible. Of course, we always wish to see our client win. I think it would have been better if Mr. Robb had told of the cases in which he was on the winning side. When giving evidence, tell the truth, but beware of the agent.

Mr. Blue (Glasgow): Mr. Robb's paper has a special interest for me, as I have a good deal of Court work in connection with the Glasgow Corporation Tramway Co., for whom I act as veterinary surgeon in cases of accidents. It is not always possible to meet the opposition veterinary surgeon, but it is advisable. In a case some time ago a stallion was injured by a tramcar and large damages were awarded on the evidence, which was, that permanent damage had been done. The said animal is this year's Glasgow District horse. I expressed the opinion that the animal would make a complete recovery.

Mr. Macfarlane (Glasgow) wished to add his thanks to Mr. Robb for his paper and said that, like the last speaker, he avoided Court work as much as possible. He never forgot the late Professor M'Call's advice: to avoid litigation if possible and stretch a point to get a settlement without going to Court; when in the witness box to answer "yes" or "no" wherever possible, and to volunteer no information. They all had been in cases where they thought their side did not get justice. He thought it was a great pity the "Sweet Bloom" filly was not destroyed right away. There would have been a great saving of money and valuable time. If there was true "ringbone," the joint surface must be involved and the animal would always be a cripple. He believed that that filly had since competed at shows.

Mr. W. Robb duly replied to all the points brought out in the discussion.

The Ultraparticles of the Blood and Chyle.

By S. H. Gage and P. A. Fish, Ithaca, N.Y.

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The presence of small particles or granules in the blood and chyle has been known for a long time.

In the blood they have frequently been referred to as blood dust, granules and debris of broken down cellular elements. In the chyle there has been no question of their identity since the time of Hewson and Gulliver who accurately diagnosed their substance as composed of fat and showed clearly their relationship to the fat in the diet. Although it has long been known that the chyle, and its contained fat, has been poured into the blood circulation through the thoracic duct, the true relationship between the blood particles or granules and the "molecular base of the chyle" has not been sufficiently appreciated. It has been simple enough, after a fat diet and the appearance, in superabundance, of the particles in the blood, to infer a correlation between

the two, but when the particles, although much reduced in number, may be noted in the blood independently of a fat diet their correlation with fat is not so inferential. Under the usual histological technique, even with an oil-immersion objective, the particles are not always easily visible; but with the darkfield microscope they appear with considerable brilliancy.

The darkfield apparatus, in connection with the method devised by Gage for obtaining an approximately accurate count of the particles in a given area of the blood, has simplified the question as to the duration of time the particles may remain in the blood in any number; when they begin to appear; and to confirm the kind of diet with which they are associated. He has shown that in man, neither a protein nor a carbohydrate diet, nor a combination of the two diets contributes to the presence of the particles in the blood; but that a fat-containing diet invariably increases their number if the fat is digestible.

It is now generally accepted that the fat in the diet is split up in the course of intestinal digestion into free fatty acids and glycerine and that the fatty acids are then rendered soluble by the bile salts and lecithin either in the form of free acids or as alkaline soaps. The products of fat digestion are therefore taken up by the epithelial cells in a soluble form and again converted into neutral fat. This conversion takes place before the thoracic duct is reached and the increasing evidence has made it quite certain that through the reversible action of the fat-splitting lipase the reconstruction is effected in the epithelial cells of the villi. The minute particles or chylomicrons represent the resynthetized fat derived from the food.

Although it is generally conceded that the principal channel of absorption for fat is through the lacteals and thoracic duct, thus permitting this fat to be passed directly into the blood without contact with the liver, there are those who hold that some of the fat, and according to others the larger proportion of it, is carried by the portal vein to submit to the censorship of the liver before getting into the general circulation. An examination of the blood of the portal vein, compared with that of the jugular vein and aorta, in seven cats and two dogs has shown that the visible fat (chylomicrons) has as a rule been less in the portal blood than in the other vessels, although variable results may be expected according to the stage of fat absorption.

Animal.	Fat Digestion.	Aorta.	Chylomicrons. Jugular Vein.	Portal Vein.
Kitten ...	6 hours	75	—	59
Kitten ...	4 hours	132	—	48
Kitten ...	7 hours	192	—	126
Cat ...	3½ hours	142	117	45
Kitten ...	6 hours	35	26	1
Kitten ...	7 hours	121	100	76
Cat ...	4 hours	13	15	5
Dog ...	6 hours	241	215	237
Dog ...	18½ hours	90	100	22

The presence of chylomicrons in the portal blood does not necessarily mean that they were directly absorbed into the capillaries of the portal system. This view would be justified only by quite uniformly finding them fat during absorption, more abundant in the portal than in the other blood of the body. The chylomicrons from the thoracic duct would, in the natural course of the circulation, reach the portal system through the capillaries of the mesenteric arteries and portal vein, and reach the liver by this route as well as the more direct one of the hepatic arteries. The liver thus has a double source of supply while the other organs of the body are limited to a single arterial supply.

The number of chylomicrons in the various parts of the circulation may be expected to vary according to the stage of fat absorption. In the early stage, the venous blood from the point of entrance of the thoracic duct to the right heart, and the pulmonary circulation and in successive order the systemic arteries and veins would show the advancing wave of these particles as they spread throughout the circulation. When the crest of the wave subsides as absorption declines and as the fat depots of the body withdraw the fat from the blood there is a diminution of the particles in, perhaps, the same successive order. Fat absorption represents a normal but temporary lipemia and indicates that for a time the fat is being mobilised in the blood more rapidly than it can be stationed in the various reserve depots of the body.

Although limited to a few cases the counts thus far made show that there is not a great deal of variation in the number of chylomicrons, but usually more are found in the arterial than in the venous blood. This difference is doubtless associated with the disappearance of the particles through the capillaries. Particles have been found in the lymph of the pleural cavity and in one of the lymph vessels of the leg, and their presence in these locations is difficult to account for except on the basis of their passage from the blood capillaries.

The path of fat absorption can be followed in a striking manner by the use of the fat-soluble red dye, Sudan III. This dye when mixed with the fat of the diet adheres to it in such a way that it is carried over into the chyle and blood giving the former a pink colour, and the plasma of the latter a similar colour. The dye is insoluble in glycerine, and during the fat-splitting process is linked closely with the fatty acids.

Its presence in the chyle and blood can be explained only by its close adhesion to the fatty material, yet in the course of our experiments there has been an occasional instance when the expected pink colour of the chyle and blood plasma did not materialise. An insufficient amount of the dye or too great a dilution in the chyle may have some bearing upon such an unexpected result.

In the herbivorous animals, variations in digestion more or less correlated with differences in the type and structure of the alimentary canal may be ex-

pected. The simple monogastric type of the horse and the complex polygastric type of the ruminants indicate dissimilar methods of arriving at similar results after the ingestion of similar foodstuffs. The amount of fat in the food normally consumed by the herbivorous animals is not great, but the large amount of fat yielded in the milk of the cow and a considerable storage of it in the fat deposits in the body, indicate that, in terms of fat alone, the outgo exceeds the income, and in order to strike a balance the eliminated and storage fat must be derived in part at least, from the carbohydrate and protein foods. In given experiments the amount of fat ingested represented a considerably larger amount received at one feeding than during any other equal period of the animal's existence.

The fat used in the experiments was butter as it was believed that it represented one of the most digestible fats. Some experiments have been carried out on horses, cows, sheep, dogs, and cats, to determine in some cases the effect of the customary diet and also a strictly fat diet upon the number of particles in the chyle and blood.

Horses. Two experiments were carried out upon the same horse at different intervals to note the changes associated with the usual diet of oats, bran and hay. The first count taken before the morning meal, instead of being the lowest, as expected, showed in both instances a fairly high number of particles present. From morning until midinght the numbers fluctuated, showing the maximum around the 5th or 6th hours. After midnight the numbers remained small with but slight changes.

In another experiment two horses were each fed a half-pound of butter after fasting since the evening meal of the previous day. They were kept fasting (except for the butter) for the following 24 hours. In one horse there was a surprisingly large number of particles present in the blood at the zero hour (just before the administration of the butter), then a decrease until the maximum was reached between the 5th and 6th hours followed by irregular fluctuations until the end of the 24 hour period.

The second horse gave a butter curve quite similar to that obtained from man. The zero hour showed only a few particles, followed by a continued increase until the maximum was reached between the 7th and 8th hours. Then there was a decrease until the 10th hour when the observations were discontinued.

Another horse was fed a half-pound of butter and five counts were made during a nine-hour period. The initial count at the zero hour before the butter was given showed the highest number of particles.

Another horse was given a half-pound of butter with which was mixed four grams of Sudan III. The next morning the horse was used as a subject for surgical exercises and was under chloroform between two and three hours before being bled to death. The interval between the administration of the Sudanised butter and the time of death was about 20½ hours. At the post-mortem no chyle could be observed in the lacteals, or mesenteric lymph vessels, but the thoracic duct showed a decidedly milky appearance at its caudal end, while at its cephalic end at its junction with the venous system the colour was pinkish, which, careful examination later showed, was due to blood which had passed over into the duct from the vein. The stomach was fairly well filled with food (after 20 hours fasting), and a slight red colour was noticed in the fundus but more markedly in the cuticular portion.

The instances in which there was a high initial count at the zero hour are difficult to account for and require further investigation.

Cattle. Observations were made over a 24-hour period upon a cow fed upon bran and hay twice a day. The initial count at the zero hour showed an almost complete absence of particles. During the daylight period there was an increased number of particles at the 2nd, 7th, and 9th hours, with the general average low. During the night period from 8 p.m. to 8 a.m. the general average was maintained at a higher level until the 22nd hour when it dropped to a very low level.

Another cow, except for some loose hay in the stall, was fasted for 24 hours and then fed a half-pound of butter. Counts were made every hour for the succeeding 24 hours with the result that the general average remained low during the daylight period except at the 6th hour and the 12th hour when there was a temporary increase. During the night period, from the 12th to the 20th hour the general average was maintained at a high level, then fell to a low level for the remaining four hours.

In both cows the evidence indicates that a greater amount of fat digestion took place during the night than during the day period. This is interesting as compared with the data obtained from the horse where under normal conditions digestion appeared to be quiescent after midnight.

A third cow was experimentally treated with a half-pound of butter to which eight grams of Sudan III. had been added. Thirteen and a half hours later she was placed upon the table and kept under the influence of chloroform for surgical exercises for two or three hours and then bled to death. At the post-mortem there was no visible evidence of the presence of the Sudan III. in any of the compartments of the stomach or in the small or large intestines. Samples of lymph were obtained from the pleural cavity, the receptaculum chyli, and from the cephalic portion of the thoracic duct. Counts were made from these samples and from the blood serum. The average of five counts for each sample was taken as representative of the number of particles present and gave the following results:—

Pleural lymph	127
Receptaculum Chyli ...	102
Thoracic Duct	139
Blood Serum, after clotting	33

Sheep. A nearly mature lamb was fed three ounces of butter mixed with three grams of Sudan III. Nineteen hours later the lamb was killed by

bleeding. In general, the lacteals did not show the presence of chyle, but one relatively large lymph trunk—the truncus intestinalis—passing along with the superior mesenteric vessels was decidedly pink as to the colour of its contents. Some of the abdominal fat had a slight pink or salmon colour, indicating that some of the fat derived from the food had been lain down as body fat. There was visible evidence of the presence of the Sudan III. in the jejunum, at about the middle of the length of the small intestine. In the rumen and reticulum there were occasional grains of oats which showed a red colour.

Two old sheep were each fed two ounces of butter with two grams of Sudan III. added. They were bled and examined six and a half hours later. The contents of the truncus intestinalis showed a slight pink colour in sheep No. 1. The only gross evidence of the presence of Sudan III. was occasional spots of red colour in the rumen and reticulum. Some of the contents of the alimentary tract, were taken, dried and extracted with ether. The ether showed a red colour from the material from the rumen, reticulum, omasum, abomasum, and faintly from the duodenum and jejunum. Sheep No. 2 received the same treatment as No. 1, but showed more complete digestion of the coloured butter. The chyle of the truncus intestinalis was decidedly pink and that in the receptaculum chyli also showed a very faint pink colour. The only gross evidence of a red colour was in the jejunum, but the ether extracts of other portions showed a red colour from the contents of the rumen, reticulum, omasum, abomasum, duodenum faintly, jejunum, ileum, and cæcum.

Two more old sheep, one of which was pregnant, were treated in a similar manner, but were killed six hours after the ingestion of the red butter. In sheep No. 4, the intestinal walls were of a pink or salmon tint and lacteals passing therefrom showed a fine pink colour. When the intestine was slit open lengthwise, the mucosa was bright red from the active absorption of the dye in the villi. In both of these sheep the truncus intestinalis was decidedly pink, and ether extracts of the dried contents of the stomach and intestines as far as and including the cæcum gave a red colour. In sheep No. 4, an examination was made of the semi-fluid material or uterine milk from a cotyledonary tuft. The darkfield revealed the presence of many particles, by analogy with those found in ordinary milk they may be called galactomicrons. The consistency of the secretion was of a thick and viscid character and represented a *gel* condition in which the particles appeared to be fixed. In a few areas of the microscopic field where the *sol* stage had developed the particles appeared in active Brownian movement. Ether extracts from the dried liver of both sheep gave very good reactions for fat but no red colour. In sheep No. 4, satisfactory fat tests were obtained from ether extracts from the ovary and a cotyledonary tuft. In none of the four mature sheep was any red colour obtained from the rectal contents within the six or six and a half hour periods.

Dogs. Experiments have also been carried out on dogs and cats as representatives of the Carnivora. Three dogs were used to test the influence of glycerine upon fat productions. Dog No. 2 was fasted since the afternoon of the previous day. He received 4 mils of glycerine diluted to 20 mils with water. Observations were taken hourly over an eight-hour period. There was an increase in the blood particles with the maximum at the 6th hour, but a high level was maintained from the 5th to the 8th hours inclusive. Dog No. 3 received 6 mils of glycerine diluted to 40 mils with water. There was no increase, but rather a decrease in the number of particles in the eight-hour period. Dog No. 5 received 16 mils of glycerine diluted to 30 mils with water. Observations were carried on hourly over a 24-hour period. There were minor fluctuations in the number of particles until the maximum was reached during the 14th and 15th hours, after which a low level was maintained for the remainder of the 24-hour period. The evidence from these experiments is conflicting, and the relation of glycerine to fat production needs further investigation and confirmation.

Dog No. 1 was afflicted with rickets and, after fasting for 17 hours, received a tablespoonful of cod-liver oil emulsion with hypophosphites. There was a quick response, as the maximum number of particles was noted at the 2nd and 4th hours.

Dog No. 4, after 23 hours of fasting, received 30 grams of butter mixed with a little rice, and hourly observations were made over a 24-hour period. The curve obtained from the observations shows a high number of particles at the 2nd, 7th, 8th, 11th, and 15th hours.

Dogs 6 and 7 received the dye Sudan III. mixed with butter. Dog No. 6 was killed six hours after receiving 0.55 gram of the dye mixed with the butter. The lacteals, truncus intestinalis, and thoracic duct were beautifully coloured pink. The body fat also showed a light pink or salmon tint. The number of blood particles or chylomicrons was high in the aorta, portal and jugular veins in the order named with but slight variations in numbers. Dog No. 7 received one gram of the Sudan III. with 30 grams of butter, 18½ hours, and a second supply of the same amount of butter with 0.5 gram of the Sudan III., an hour and forty minutes, before death. The post-mortem indicated that the second supply of the dye had passed only a short distance (about six inches) down the duodenum, with the major portion remaining in the stomach. The effect of the first supply of the dye was pronounced. The body fat showed a pink colour, while the renal and omental fat were quite markedly coloured. Along the intestine the jejunum did not show any satisfactory gross evidence of the red colour, but in the ileum and cecum there was a red colour. In the rectum the gross evidence of the colour was dubious but an ether extract of the contents was decidedly pink. The bile appeared to be of a redder colour than normal but did not give satisfactory tests for fat with osmic acid nor Sudan III. The walls of the gall bladder after being washed and dried and extrac-

ted with ether gave quite satisfactory fat tests. Ether extracts from the dried liver and spleen gave positive fat reactions, but there was no evidence of a pink colour in the ether extracts. There was no evidence of colour in the lacteals but the contents of the thoracic duct were decidedly pink. An ether extract of the dried blood serum gave a faint pink colour, but the extract did not give very satisfactory fat tests. A count of the particles showed the highest number in the jugular vein and aorta, and the lowest in the portal vein.

Cats. The experiments upon the cats were mainly for the purpose of comparing the number of particles found in the blood of the portal system with that of the general circulation. In the seven cats and kittens examined for this purpose all showed a greater number in the blood of the aorta or jugular vein than in the portal vein. In some instances the difference was quite marked. Three cats were each given five mils of oleic acid with a knife point of Sudan III. dissolved in it. They were killed at intervals of three, four and seven hours. In all three there was a decided increase in the amount of the chyle in the truncus intestinalis and more or less of a cloudiness in the contents of the thoracic duct. There was, however, no evidence of a pink colour in the chyle of the cats killed at the third and seventh hours, but in the cat killed at the 4th hour the contents of the truncus intestinalis were distinctly pink but there was no evidence of the pink colour in the thoracic duct.

These experiments are interesting in showing the relatively short time that is required to convert only one of the constituents (oleic acid) into a complete neutral fat. The absence of the pink colour in the lymph vessels in some of the cases is quite possibly due to an insufficient amount of the dye and its consequent dilution in a relatively large mass of a milky mixture.

Fat and Carbohydrate Diets. The proportion of fat normally existing in the diet of the carnivora is considerably higher than in that of the herbivora. Exclusive of the stomach, which is usually thought to be little concerned as a factor in fat digestion, the intestinal area of the herbivora is much greater than that of the carnivora. Since some of the experiments on the horse show that the blood is rich in the chylomicrons within the 24-hour period although no additional fat had been administered, the explanation may possibly be associated with the longer and larger intestine and its oxygen-rich carbohydrate diet as compared with the oxygen-poor fat diet in the carnivorous intestine. It is relatively easy to convert food fat into tissue or species fat and although other functions are involved, a relatively short intestine might suffice for this purpose. It is obviously more difficult to manufacture fat from carbohydrate or protein than it is from fat, and while the actual conversion of the former substances into fat may occur in the deeper tissues it is not unreasonable to consider that for some of the preliminary stages the larger intestinal area is required.

Methods. In counting the particles an ocular micrometer was used with the marking arranged to make the counting as easy as possible. By comparison with a stage micrometer the value of the spaces of the ocular micrometer may be determined and also its proportionate area of the whole microscopic field. In our work the ocular micrometer area represented about one-tenth of the whole field. In focusing, a level was reached which showed the particles to the best advantage, and this focus was not changed while the count was being made. Only particles showing the Brownian or pedetic movement were counted as it was believed that particles of dirt or foreign material adhering to the slide might in this way be excluded. The figures used were based upon the average of the number of particles counted in five ocular micrometer fields.

Surgical Technique—Suturing.

In presenting a phase of technique that has been very useful to him, Prof. Kingman says :—

"Suturing enters as an important factor in nearly every operation, and frequently occupies as much time as incision, dissection and hemostasis. In Cæsarian section, for example, one's time is principally taken up in suturing. Many other operations demand an equal amount of attention to uniting the wound. Next to cleanliness, the operator is most concerned in thoroughness or carefulness, but following these in importance comes speed. A patient can withstand a severe operation, provided the animal is not made to endure it for a long period of time and given large amounts of anæsthetics or restrained in a cramped position. The time element enters in as a matter for careful consideration in conserving the strength and resistance of the patient and in obviating surgical shock. Speed in suturing goes a long way toward reducing the length of time that the patient must remain under restraint or anæsthesia.

"With the idea in view of improving our technique in suturing, I wish to present several methods of tying knots.

"It is to be remembered that the hands are frequently covered with blood and that securing the ends of the suturing material is liable to consume more time than it should.

"The needle having been passed through both margins of the wound, it is held with the needle holders in the right hand. The free end is picked up with the thumb and finger of the left hand and the opposite suture grasped with the second and third fingers. The sutures are then crossed until the free end may be drawn under by the second finger; releasing the hold with the thumb and first finger makes the first part of the knot. The free end is again grasped by the thumb and first finger, the second and third fingers are laid with the palms up, while the needle end is crossed over again and the second finger draws the other end under, completing the knot.

"Forceps may be used instead of fingers. The following method is preferred by many operators. We call it the two-forceps method. After passing the suture through both margins of the wound, the suture is wrapped around the end of thumb, forceps held in the left hand; the free end of the suture is then grasped with the forceps and drawn through the loop. The same thing is repeated in the opposite direction, completing the knot.

"The four forceps method is less practicable than the first two described, but is very useful when skilled assistance is available. The assistant grasps the needle end of the suture three inches above the wound with the forceps in his right hand; he then ties the first part of the knot the same as in the second forceps method. The operator then completes the second part of the knot by the same process.

"I wish to describe in detail the application of three sutures that have proved to be especially useful. The first of these was the so-called interrupted mattress suture. Its advantages lie largely in the fact that it brings into apposition raw surfaces, turning the external surface away from the margin of the wound.

"To illustrate one instance in which the mattress suture is particularly adapted, I wish to discuss the treatment of split ears. The split ear is of common occurrence and wherever barbed wire is found. However, this is not the only offender. One was brought to our attention in which a Jersey bull split his ear for a length of four or five inches on a nail, giving him a very unsightly ear, especially if he was to be used for show purposes. It is seldom advisable to attempt suturing an accidentally split ear until the edges have completely healed. The operator may then have a clean field upon which to work.

"The technique consists in preparing the field in the usual manner; the entire ear is scrubbed with Dakin's solution, and the area lathered with tincture of green soap. The hair should be shaved from both sides of the ear for at least a space of half an inch in width. Anæsthesia consists in chloral enough to quiet the animal. Some beneficial results have been obtained from the use of apothesine over the posterior and internal auricular nerves. A sterile sheet with a hole in the centre is placed over the head and the ear drawn up through the hole. All instruments should be sterile, as well as the operator's hands. An incision is made on the edge of the healed surface, exposing two flaps of skin and the yellow fibrous concha. The flaps are loosened to the extent of one-fourth inch and the protruding concha removed the entire length of the incision. The operation is repeated on the opposite side. The cutaneous surfaces are then united up by means of mattress sutures of linen, one-half inch apart. By this method the fresh surfaces are maintained in apposition. The inside and outside of the ear are sutured separately. The united surfaces are then covered with a solution made of gum mastic in benzol. At the end of three days the suture should be examined for signs of infection. Then if moisture is present or if there are other signs of pus, the infected suture should be removed and the wound bathed in alcohol or 1 per cent. of tincture of iodin. Under ordinary conditions the wound unites by first intention. Occasionally a few of the sutures must be removed or treated with alcohol, but if given the proper attention small infected areas need cause no alarm. In fact, cases have been operated upon and given no further attention after the first day and made complete recovery, although a few of the sutures became infected.

"I should like to call attention in detail to two other methods of suturing. The first of these is a continuous peritoneal and subcutaneous suture, used especially in small animals where the peritoneum and abdominal walls are to be closed.

"The thumb forceps lifts the peritoneum on the right side away from the viscera, and the needle is passed through the muscle and peritoneum. The peritoneum of the left side is then lifted and the needle passed through the peritoneum and muscle from beneath. The suture is then grasped with the fingers or forceps, drawing the peritoneal surfaces together and lifting them so that the needle may pass through both at the same time. This is repeated until the peritoneal wound is closed by a simple continuous suture. The skin is then grasped and held, while a subcutaneous suture is placed in it. This suture is then carried continuously from one side to the other until the skin wound is closed. The two ends of the suture are united by a surgeon's knot. If No. 1 gut is used, the knot should be small enough to be completely hidden.

"The second is the mattress suture as used in closing the wound and hernial ring in the treatment of ventral hernia.

"An elliptical incision is made over the fundus of the sac and the skin carefully removed, exposing the serous sac. This separation of cutaneous and serous coats is continued until the hernial ring is reached. The tunic and fascias forming the ring are firm and may be easily recognised by the sense of touch. One frequently encounters a thick layer of fat lying close to the hernial ring, which impedes the progress of dissection. Hæmorrhage should be slight and is easily controlled by means of sponge and forceps. One should avoid sponging as much as possible, since it is a common source of infection. Repeated wiping of the tissues lowers their resistance and inhibits repair.

"The next step consists of preparing the flaps of fascia for suturing. One begins by splitting the margin of the ring as close to the parietal peritoneum as possible, taking great care not to invade the peritoneal cavity. The flaps should be one-half to three-fourths of an inch in width. A full curved needle threaded with No. 4 catgut is then passed down through the left flap at a point one-half inch from its margin, down through the margin of the opposite flap, then up through the margin of the same flap and up through the left flap one-fourth of an inch from the starting point. This constitutes a mattress suture. Repeat the sutures over the length of the hernial ring. The sutures should then be drawn tight. This will force the right flap beneath the left, causing them to overlap one-half inch. The free margin of the right flap should then be sutured to the left surface by means of a continuous suture. The skin should be sutured with a mattress suture, bringing into apposition considerable denuded surface.

"A place for drainage is left at the anterior commissure of the cutaneous wound. One may insert a strip of gauze to be removed at the end of 12 hours. The entire wound, except the place for drainage, is covered with gum mastic and gauze. The wound will unite by first intention if reasonable care has been observed to avoid the introduction of infection. The skin sutures may be removed in about five days; the catgut sutures are permitted to take care of themselves.

"The advantages of this technic over some of the others commonly used are that the peritoneal cavity is not invaded, and further, that the overlapping of the fascias insures a permanent union and obliteration of the hernia. Also there is no danger of injury to intestine or other viscera. If one should fail in the matter of asepsis, there is little to fear from peritonitis, since one has only a wound of the skin and subcutaneous tissues to treat.

"In case of infection, one or two skin sutures should be removed and the wound dressed with Dakin's solution, or a 2 per cent. alcoholic solution of iodin."

[KINGMAN (H. E.), *Jnl. Am. Vet. Med. Assn.*]

Swine Fever Regulations Protest.

At a recent meeting of the Hunts. Agricultural Committee, referring to the report of the Diseases of Animals Committee, Ald. Tebbutt asked how much longer was swine fever going to occupy their attention. After twenty-five years' experience and enormous expenditure upon officers, there was just as much swine fever and as many irritating regulations.

The Chairman: What can be done?

Ald. Tebbutt: I think the time has come when it ought to come under the Geddes axe and be swept out of existence.

The Chairman: You are only expressing a general opinion, and nobody minds.

Ald. Tebbutt thought they ought to call the attention of the Board of Agriculture to the futility of the present swine fever orders.

Owing to cases of foot-and-mouth disease having been reported, the Danish Minister of Agriculture has prohibited the export from Zeeland of live cattle and pigs.

The Veterinary Record.

18th February, 1922.

Abstracts and Reviews.

Hæmorrhagic Meningo-Encephalitis in Anthrax.

Among the interesting and relatively infrequent complications of anthrax is hæmorrhagic meningo-encephalitis; as an instance of such a complication, the following case seems worthy of note:—

A young man of about twenty, with a small anthrax pustule 1·5 c.m. in diameter over the right malar prominence, suddenly developed signs of acute meningeal irritation one afternoon, accompanied by a temperature elevated to 104° F. Lumbar puncture was performed the following morning and a blood culture was made. The cerebro-spinal fluid obtained was definitely bloody to the naked eye. Microscopically it showed red blood cells in abundance, a few polymorphonuclear leucocytes, and enormous numbers of large bacilli, which occurred singly and in chains. These bacilli were so numerous as to constitute a feltwork appearance in the smear. Early the following morning death ensued, and at post-mortem the conditions found were:—

A pustule 1·5 c.m. in diameter over the right malar prominence. Enlargement of the left parotid, which was swollen and congested, but not necrotic.

Thorax.—In both pleural cavities there was a hæmorrhagic serous exudate; the lower lobes of both lungs were markedly congested. In the pericardium there was a moderate amount of thin clear fluid which was not hæmorrhagic.

Abdomen.—There were noted further acute splenitis, acute bilateral nephritis, and the mesenteric lymph nodes were moderately congested. The liver appeared unchanged.

The small intestine showed numerous small hæmorrhagic areas, about 2·0 c.m. in diameter, at intervals between the mid-jejunum and a point in the lower ileum inches above the ileo-cœcal valve. Over some of these areas the mucosa was partly broken down.

Head.—On removal of the skull cap the brain was noted to be tensely bulging the dura, which appeared purple from the blood underneath. The whole surface of the brain—both cerebrum and cerebellum—was red from the presence of blood in the arachnoid meshwork, which almost completely hid the convolutions. The surface of the brain after removal of the pia-arachnoid showed universal pin-point ecchymoses. The convolutions of the brain were much flattened on account of the swelling of the organ. The cerebro-spinal fluid present was bloodstained. Throughout the brain there were numerous small petechiæ similar to those seen under the pia-arachnoid.

Bacteriology.—The original cerebro-spinal fluid removed before death gave bacillus anthracis in pure culture; the same organism was grown from the blood culture which was made at that time. Cultures made post-mortem from the spleen and surface of the brain gave pure growths of the anthrax bacillus. Smears from the surface of the brain showed the same felted mass of bacilli as was noted in those made from the cerebro-spinal fluid. A guinea-pig inoculated subcutaneously with a culture of the bacillus died in 20 hours and from its spleen bacillus anthracis was recovered. Unfortunately, the above case occurred under conditions which precluded the making of histological examinations.

In this case, evidently from the facial pustule as a primary focus, a bacteræmia had supervened, resulting in the production of secondary hæmorrhagic lesions, such as those in the intestine, and the hæmorrhagic meningo-encephalitis. Death was due to the cerebral lesions. House[1] has recently described three cases of hæmorrhagic meningo-encephalitis in anthrax, and in searching the literature he found reports of 45 similar cases. In his cases the gross lesions were like those met with in the present instance. The brains of his three cases were examined histologically in detail and the essential microscopical picture was found to be one of acute inflammation with hæmorrhage—the large amount of hæmorrhagic exudate, and almost complete absence of retrogressive changes being in accord with the character of anthrax lesions elsewhere in the body. He concludes that the lesions in the brain "are essentially extra-vascular and meningo-encephalitic." In some of the cases described the brains present no intracerebral hæmorrhages. It is presumed by House from the study of his cases, in one of which there were no cortical hæmorrhages, that the occurrence of these depends somewhat on the duration of the inflammatory process. In guinea-pigs inoculated by House no meningeal lesions occurred, although Gilmour and Campbell[2] have noted them. With regard to the spread of the infection, Bruce and Shennan[3], Risel[4], Fulci[5], and Herzoz[6] have reported cases in which the brain and its membranes were infected by extension from the original focus by way of the lymphatics. In one of House's cases he concludes that the affection of the brain, being secondary to a primary focus in the intestine, was hæmatogenous. Out of 36 of the reported cases in which the location of the primary lesions was given, 17 were in situations removed from the head, such as the intestine, lungs, and extremities, and in these presumably the secondary cerebral conditions were produced by way of the blood stream.

This case illustrates the characteristic and interesting hæmorrhagic lesions which occur in the meninges and brain as a result of their infection with the bacillus of anthrax. The infective agent in such cases can be readily obtained from the cerebro-spinal fluid withdrawn before death, or from the hæmorrhagic exudate on the surface of the brain post-mortem. In this case an anthrax bacteræmia resulted from a malignant

pustule of the face, and gave rise to secondary lesions in the brain, intestines and parotid.

["A Case of Hæmorrhagic Meningo-Encephalitis in Anthrax." By B. SHANKS, Captain I.M.S., Professor of Pathology, Medical College, Calcutta. *The Medical Press.*]

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Amylolysis in Herbivora.

It has been a time-honoured belief among nearly all of the domestic animal physiologists that the amylolytic properties of the saliva of herbivorous animals is feeble as compared with that of man.

That this should be the truth has always seemed remarkably strange in view of the need of an exactly reverse requirement. The large starch content of the feeds of these animals calls for a contrary condition; their saliva should for all intents and purposes be capable of starting the process of starch conversion toward entire completion before the food is delivered into the stomach.

In experiments we have made with saliva dripping from an open Steno's duct we have always found that the liquid collected did not convert starch into sugar, in spite of the fact that when a well masticated bolus retrieved from the mouth of horses always showed complete conversion after proper incubation. From these findings we had long since concluded that the parotid gland did not secret much ptyalin and that its function was a physical rather than a chemical one, that ptyalin must therefore come from the other salivary glands and that much of the conversion was effected in the intestinal digestion by the enzyme of the pancreas—amylopsin.

How easily one may be deceived by experiments even when thought to be conclusive is shown by the investigations of Lieut.-Colonel Watkins-Pritchard, R.A.V.C., (*Veterinary Journal*, September, 1921), in which it was proved that the difference in the ptyalin content of saliva may be due to the method of collecting the sample. He has shown that saliva obtained after the administration of such sialagogues as pilocarpine and arecoline contains no such reagent as ptyalin, but when collected by placing a clean sponge in the well washed mouth of horses, starches were completely converted by the samples thus obtained. This simple experiment was made on ten different horses with the same general result.

These experiments seem to prove that there is a great difference in the ptyalin content of saliva flowing into the mouth under the stimulus of a palatable bolus and that obtained by unnatural means: sialagogues or duct fistulæ. And they also show that the popular impression that starch conversion in the herbivora is effected chiefly in the intestinal digestion is erroneous.

The great care with which the herbivora reduce their feed into fine particles well mixed with saliva in the mouth before delivery to the lower digestive organs, in view of these facts, leaves little doubt that we have been mistaken about the relative importance of ptyalin and amylopsin.

The student of this subject is also reminded that the amount of saliva required to convert starch into sugar is enormous and that experiments that do not take this into account will miscarry. A horse in eating hay incorporates it with four times its weight of saliva; oats and coarse grains with twice its weight; ground feeds with about equal parts and succulent foods with one-half their weight.—*Veterinary Medicine*, January, 1922.

Veterinary Health Service in France.

The diminution of over 50 per cent. in cases of rabies notified in Paris and the Department of the Seine for the year 1920 is encouraging, especially as the figures for the four quarters of the year were 144, 108, 47, 34, showing a constant decrease; the 333 cases recorded included 326 dogs, 6 cats, and 1 bear. The total number of cases in France has also been reduced by 1,807, giving a diminution of 39 per cent. on the 1919 figures; 2,136 persons were bitten by dogs and other animals in 1919, of whom 6 died; only 1,403 were bitten in 1920, with 1 death.

The annual report by Prof. H. Martel on the French Veterinary Service of Paris and the Seine Department shows how vigilantly the public health is protected also from other diseases of animal origin in this district. The incidence of tuberculosis in animals does not decrease, and more efforts should be concentrated on methods of prevention. Prof. Martel states that the intra-dermic method of testing for tuberculosis is the one most favoured by cow-keepers. Tuberculosis has been fairly common in pigs, especially those which have been kept in boarding schools, orphanages, and institutions, and the authorities stress the necessity of cooking scraps of human food in order to check the prevalence of tuberculosis in young pigs. The frequency of tuberculosis in fowls is a matter of some import; of 657 fowls suspected and examined 342, or 52 per cent., were found to be tuberculous. The incidence of glanders has increased slightly, but it is gratifying to know that out of 1,165 horses and 119 mules imported not one reacted to the mallein test. Great care is taken to cleanse and disinfect trucks used in animal transport by the use of steam and sodium hypochlorite. Damaged and putrefied carcases have been the chief causes of seizure and destruction of fowls, geese, ducks, turkeys, lambs, goats, pigeons, and rabbits. One of the most noteworthy points in Prof. Martel's report is the good work done in the inspection of the egg supply. It is probable that in this country real benefit would accrue from a thorough examination of the supply of eggs to be offered for sale. In France over 2½ million eggs were thrown out by the inspectors as unfit for human consumption. The

shadow test seems to be the one chiefly relied on to discern the quality of the egg. The October supply of eggs was most faulty, because at this time the preserved eggs are put on to the market. In April exotic eggs are rare, and the country supply shows good quality. Apparently but little bad food escapes the vigilance of the French Veterinary Service, and this important branch of the Public Health Service seems to be very efficiently managed.—*The Lancet*, December 24th, 1921.

Special Meeting of R.C.V.S. Council.

REVISED PRELIMINARY EXAMINATIONS QUESTION.

(*concluded.*)

The following is the conclusion of the discussion upon a motion moved by Sir John McFadyean :—

"That the revised list of Preliminary Educational Examinations adopted at the Special Meeting of Council on the 8th April last shall not come into force until a date to be hereafter determined by the Council."

Mr. BANHAM asked the Secretary if the students who will enter the colleges in October next could submit their educational certificates in June.

The SECRETARY : Yes, immediately they pass ; but, as a matter of practice and not as a matter of of what is theoretically possible, that is not what actually takes place. Veterinary students do not understand the laws of this College ; indeed, veterinary surgeons themselves do not, and you would not expect a more complete knowledge of the bye-laws of the College on the part of people who are not yet even entered than you can expect from veterinary surgeons themselves.

The PRESIDENT : Does anyone else desire to make any remarks ?

Mr. THATCHER : I should like to say that what Mr. Bullock has stated is perfectly correct.

Mr. MALE : I do not think many of us are quite clear—certainly I am not—as to what is really the intention of the proposer and seconder of this resolution. Is it to postpone indefinitely and for ever these revised regulations ?

Sir JOHN MCFADYEAN : No, no.

Mr. GARNETT : No. You can move them next time.

Mr. MALE : I am glad you say that, because I know you are not in sympathy with the higher standard.

Sir JOHN MCFADYEAN : You can leave that out.

Mr. MALE : If you are in favour of having the new regulations, I am glad to hear you say so so emphatically, and that it is not your intention to postpone them indefinitely. Therefore I presume it is your intention to agree to them at a later date. If we are quite clear that they are not to be postponed indefinitely, and that there is an injustice to the students (no one wants to do any injustice to the students), then I think we must alter this date. I support this resolution of Sir John McFadyean's, but at the same time I give notice of motion that the date shall be altered to a time which you think is fair for the students.

A MEMBER : What date do you suggest ?

Sir JOHN MCFADYEAN : You cannot do that until my motion is passed.

Mr. MALE : I should postpone it for another six months, to the 1st January, 1923. I will give notice of that motion.

The PRESIDENT : You must speak to the present motion at present.

Sir JOHN MCFADYEAN : Mr. Male is out of order, is he not ?

The PRESIDENT : Yes ; quite out of order.

Mr. MCINTOSH : With regard to this resolution, I think we are wasting time. This matter has been already very carefully discussed by every member of the Council. I was not a member of the Council at the time, but I dare say that most of you know what my views are in connection with the subject. I think that we should go forward with the matter as it stands at the present time.

The PRESIDENT : I think there has now been a sufficient expression of opinion on both sides, and it is time I applied the closure.

Mr. BANHAM : I am afraid that although I said I should vote for the motion, I must insist upon a certain date being fixed as to when these revised regulations should come into force.

Dr. SHARE-JONES : You cannot do it without another resolution.

Mr. WILLETT : That is my difficulty, and the difficulty of many of us down here. If Sir John had fixed a later date we would have agreed to that, but we are not prepared to accept the suggestion that we should adjourn the thing *sine die*.

Mr. TRIGGER : Give notice to fix the date.

Mr. GARNETT : Anyone is at liberty to give notice of motion after this meeting and put it up on the board—that the matter shall be reconsidered at a later date, say this day three months, at our next quarterly meeting.

Dr. SHARE-JONES : May I ask the Solicitor if we can do that, and discuss this in three months' time, if we pass this to-day ?

Mr. GARNETT : Yes.

The PRESIDENT : I think it is perfectly obvious that if we pass this resolution to-day, which includes the words "a date to be fixed hereafter," the date can be fixed, say, in April. April is in the hereafter.

Dr. SHARE-JONES : As the intention is perfectly clear, in order to remove all opposition, why should not Sir John withdraw this resolution and give notice of motion to-day that these regulations shall come into operation in January next, and then he would get every vote at this table.

Sir JOHN MCFADYEAN : I think, sir, I have the right to reply, but I promise not to be very long. Let me say, in the first place, that I prefer to put this motion to the Council, because I think I have made out a good case for believing that an absolute injustice will be done unless it is passed, and that you will leave the educational authorities, the parents

and the schools in a state of very great uncertainty. All that I assume, if this is passed, is that the revised regulations will not come into force as early as August next; a longer notice, then, will be given. There is no need for people to cry out about staving it off indefinitely. I went out of my way to point out that, if this was carried, immediately after it is open to anyone to get a new date fixed, in three months' time, but, of course, I think the Council will be stultifying itself if it passes my resolution and then afterwards adheres to the original date or even does not give a considerable extension beyond that. That is my whole case.

I want to say just a word or two about some of the things that were a repetition of the arguments used at the last meeting, when the resolution varying the standard of the preliminary examination was passed. I always think that Sir Layton Blenkinsop is a tower of strength to the side that he is opposed to, because he seems to ignore absolutely what are patent facts, or to present arguments that suggest exactly the opposite conclusion to the one that he is trying to persuade people to adopt. What I want to point out is the absurdity of the references that are made to what the medical profession is going to do with regard to the preliminary examination. This is not the medical profession, and it is a very, very uncertain question whether we really would be justified, or will ever be justified, in having a standard of general knowledge examination equivalent to what the General Medical Council may at the time determine. When I deprecate the sudden raising of the standard of the preliminary examination, I do so because I apprehend it may actually damage the profession with the country if the number of members of the profession becomes greatly reduced. In other words, I have always said that one should keep one's finger on the pulse of the register, and, when there is any appearance of overcrowding in the profession, that is the time to raise the standard of the preliminary examination and, if necessary, to extend the curriculum. The medical profession has not got a falling register. I do not know whether those who are asking us to follow the medical profession know the actual facts. I have got them before me. They were given by the Secretary of the British Medical Association quite recently. The facts are these—that within the last eight years the number of medical students in this country has, as nearly as possible, doubled. Instead of having a falling register, the figures are these: In 1912, before the war, there were 1,397 registered medical students in Great Britain, last year there were 2,531. One hundred more would have been just double the number. Of course, if our figures were in the least comparable to those, I should advocate raising the preliminary examination. I am sorry that Professor Share-Jones was prevented from developing fully once more the arguments that he used at the Committee meeting on Wednesday last, because I think they also would have helped my side. Professor Share-Jones seems to think that the more difficult you make the preliminary examination the more men will drop into the veterinary profession, and he thinks we are in danger at the present time because, as he puts it, there is not a sufficient gap between the veterinary profession with regard to general education and the unqualified practitioner. What he said was: "We must try to increase that gap."

The PRESIDENT: You are undoubtedly getting out of order now, Sir John.

Sir JOHN MCFADYEAN: Would anyone believe that the standard of education that is being condemned as hopelessly inadequate is that of the gentlemen sitting round this table.

Dr. SHARE-JONES: I hope, sir, after the speech of Sir John McFadyean, directed to what I said last Wednesday, you will allow, in justice to myself, a transcript of my speech relative to that particular subject to be made and printed. I ask permission from the chair for that to be done.

The PRESIDENT: In that case, Sir John would have to continue and reply to it.

Sir JOHN MCFADYEAN: I am sorry if I said anything that is thought improper. What is it that Professor Share-Jones wants?

The PRESIDENT: He wants to incorporate his remarks of last Wednesday in the discussion of to-day.

Sir JOHN MCFADYEAN: That is not for me to decide.

Mr. GARNETT: It cannot be done.

Dr. SHARE-JONES: May I ask for that permission?

The PRESIDENT: I do not see how that permission can be granted.

Col. BRITTLEBANK: It is not before the Council.

Dr. SHARE-JONES: Sir John ought not to have referred to it, then.

The PRESIDENT: I stopped his reply.

Dr. SHARE-JONES: I move that the names for and against be taken down.

The PRESIDENT: Very well.

The resolution was then put and carried, 12 voting for and 10 against.

For (12): McFadyean, Mulvey, Garnett, Stockman, Trigger, Brittlebank, Male, Price, Carter, Banham, Spencer, Locke.

Against (10): Blenkinsop, Slocock, Craig, Buxton, Willett, McIntosh, Simpson, Coleman, King, Share-Jones.

VOTE OF THANKS TO THE PRESIDENT.

Mr. TRIGGER: I should like to propose a hearty vote of thanks to our President for his excellent conduct of the business to-day.

The resolution was seconded and carried by acclamation, and, the President having briefly acknowledged the compliment, the meeting terminated.

Victoria Veterinary Benevolent Fund.

A quarterly meeting of the Council of the Victoria Veterinary Benevolent Fund was held at 10 Red Lion Square, London, W.C.1, on Thursday, January 5th, when the following members were present:—

Mr. S. H. Slocock, President, in the chair; Mr. G. A. Banham, Major-General Sir L. J. Blenkinsop, Col. J. W. Brittlebank, Professor J. F. Craig, Messrs. H. J. Dawes, F. W. Garnett, A. Gofton, F. L. Gooch, P. J. L. Kelland, G. H. Locke, Sir J. M'Fadyean, Messrs. J. W. McIntosh, R. C. Trigger, and E. A. West.

1.—*Apologies for absence.*—Apologies for absence were received from Messrs. J. Abson, C. W. Townsend, J. Ewing Johnston, A. Spicer, and T. M. Guinness.

2.—*Minutes.*—The minutes of the previous quarterly meeting having been published, were taken as read and confirmed.

3.—*Secretary's Report.*—The Secretary submitted the following report, which was received and adopted:

Since the previous quarterly meeting the following donations and new subscriptions have been received:

DONATIONS.

	£	s.	d.
Bolton's Cinema, per E. A. West	56	14	0
F. W. Garnett	34	2	4
Sir John M'Fadyean	21	0	0
S. Durham and N. Yorks. V.M.S., Balance of Funds	11	11	0
W. W. Smart	1	1	0

NEW SUBSCRIPTIONS.

Scottish Metropolitan V.M.A.	2	2	0
T. D. M. Martin	0	10	6

FROM COLLECTING BOXES.

North Ireland V.M.A.	2	3	0
Royal Counties V.M.S.	3	5	0
S. H. Slocock	1	0	0
D.D.V.S., Southern Command	0	4	0
S. M. Woodward	0	10	0
H. L. Cormack	1	7	6
W. Jackson Young	3	3	6
D.D.V.S., Aldershot Command	0	10	0
E. Whitley Baker	1	7	6
B. De Vine	0	10	0
D.A.D.V.S., London District	0	5	0
J. Martin	1	1	0
A. M. Munro	18	6	0
P. J. L. Kelland	0	10	0
F. W. Conchie	0	15	0

In accordance with the Memorandum of Association, the Executive Committee during the quarter authorised the purchase of £400 of consols out of donations. This sum has therefore been added to the capital of the Fund.

4.—*Cases.*—A report from Mr. Howard was received on cases Nos. 4 and 56.

It was resolved that case No. 56 be struck out.

Cases Nos. 22, 26, 35, 43, and 57 were considered, and the grants in each case were renewed, but in case 43 the grant was increased to 15s. per week.

Case No. 59. Mr. J. M.—The Secretary reported that, as authorised at the previous meeting, the Executive Committee had made a grant of 10s. per week, which was being paid to this necessitous member through the kind offices of another member.

It was resolved that the action of the Executive Committee be approved, and that the grant be continued.

Case No. 60. Mr. J. A. D.—An application was received from the member for assistance, and it was resolved that the Secretary be authorised to pay a sum not exceeding £1 per week for five weeks.

Case No. 61. I. M., son of deceased member.—Mr. Trigger submitted a report on this case, and it was resolved that a grant of £10 be made out of the special donation received from Mr. Garnett.

Notes and News.

Returning to Horses.

Farmers in many parts of the country, says the *Daily Express*, are abandoning the motor tractors and lorries they bought during the war, and are reverting to the use of horses.

They find the cost of maintenance of motor vehicles too heavy now that repairs and renewals are becoming necessary, whereas there is a great reduction in the price of good horses.

"Farmers look forward to a general return to the horse-drawn heavy vehicle and an early revival of the horse-breeding industry," said Mr. A. D. Allen, secretary of the National Farmers' Union, to a *Daily Express* representative. "Other trades are following our example. One large brewing firm recently purchased 1,000 sets of harness."

The subject was discussed at a recent meeting of the Farmers' Union, and also by the Sussex Stock Improvement Society in Sussex. There was general agreement that the time had come for a return to horses.

Eradication of Rabies in Great Britain.

By an Order which was made by the Ministry on the 30th January, the remaining muzzling and movement restrictions imposed in Great Britain on account of rabies, viz., those in force in Hampshire and Wiltshire, were finally removed as from the 6th February, no case of rabies having occurred in those areas, nor indeed in any part of Great Britain, since 7th June, 1921.

In view of the freedom of the whole country from rabies for a period of eight months, the Ministry has every reason to believe that the disease has been entirely eradicated. After 16 years of freedom of the United Kingdom from rabies, the disease was re-introduced at Plymouth in the summer of 1918 by an imported dog, which, owing to the abnormal conditions arising from the war, escaped the attention of the Customs authorities and the Quarantine Regulations. This case was directly responsible for no fewer than 129 cases of rabies between Devon and Cornwall alone before the disease was finally eradicated from those counties in August, 1919. The risk of re-importing rabies was increased during the period

of demobilisation following the armistice, when, in spite of Army, Navy and Air Force Regulations forbidding importation by members of His Majesty's Forces except under quarantine conditions, dogs were undoubtedly landed illegally. Some of these were detected and the offenders dealt with. To such cases must be attributed the invasions of rabies in South Wales in March, 1919, in the Metropolitan area in April, 1919, in North Essex in August, 1919, and in Wiltshire, extending into Hampshire and Dorsetshire in July, 1920.

The total number of counties affected by the disease during the whole period from 1918 to 1921 (inclusive) was 17—all in the South of England or South Wales. The total number of cases of rabies actually confirmed was 319, but the number of reported cases investigated by the Ministry was 908. The total number of persons known to have been bitten by affected or suspected dogs was 236. Of this number, 87 were bitten by actually rabid dogs, and 123 in all underwent Pasteur treatment, by arrangement with the Ministry of Health, either in Paris, Plymouth or London. In no case were any of these persons known to have developed hydrophobia.

The methods adopted by the Ministry in dealing with the disease may be summarised as follows:—

(*a*) Notification of suspected cases by telegram to the Ministry. Diagnostic inquiry at the Ministry's Laboratory by examination of the head and neck of suspected animals;

(*b*) Immediate local inquiry by Inspectors of the Ministry and Local Authority into the history of affected dog and all contacts, particulars of persons bitten being sent at once to the Ministry of Health for action; and

(*c*) On confirmation of a case of rabies, an Order is immediately applied by the Ministry to an area of about 15 to 20 miles radius around the place where the affected dog was found, requiring the muzzling of all dogs in public places and prohibiting the movement of all dogs out of that area except by licence and under quarantine conditions.

The consistent pursuit of this policy of muzzling, plus movement restrictions, involves considerable work, and no fewer than 18,053 licences have been issued authorising the movement of dogs under proper quarantine regulations. There is no doubt, however, that the control exercised by the Ministry has been completely justified by its success.

The German Tuberculosis Congress.

The reports to hand of the German Tuberculosis Congress, held on May 19th to 21st inclusive, at Elster, show that it was well attended, German and foreign visitors numbering about 700. The chief fault found with this congress was the omnipresence of the multiple tautologist. For lack of adequate rationing of these congress pests, several delegates with messages to give were crowded out and received no hearing. Congress logorrhœa is a cosmopolitan evil which bids fair to smother medical meetings and to keep away speakers with something new and interesting to say. This state of affairs is the more deplorable as there are certain remedies open to the organisers of congresses animated by the ambition to suppress the congress bore.

In his opening address Kirchner, of Berlin, discussed the influence of the war on tuberculosis, showing how it affected different areas and different age-groups. In an interesting lecture on the part played by domestic animals in the spread of tuberculosis, Prof. Lydia Rabinowitsch referred to studies she had carried out on dogs and cats. Of nineteen strains of tubercle bacilli cultivated from dogs, as many as sixteen had been found to belong to the human type; only one belonged to the bovine type, and the two remaining strains were of a transitional type. Of five strains of tubercle bacilli cultivated from cats, three belonged to the human and two to the bovine type. Prof. Rabinowitsch was inclined to regard domestic animals as a fairly important source of infection of tuberculosis to man. Papers by Wassermann and Neufeld on immunity in tuberculosis were in a sense discouraging; neither believed in the existence of remedies which attacked the tubercle bacilli in the body, the only remedies which were effective being such as acted on the resistance of the tissues. Friedmann's turtle vaccine did not figure on the programme of the congress, but Klopstock interjected some comments on this remedy, which he had found to be useless in advanced cases, and so uncertain in its action in early cases that the results achieved did not bear out the puffs of its promoters. Wassermann referred to it as not only useless, but dangerous. Another remedy discussed in unflattering terms was the Deycke-Much partial antigen treatment. Neufeld declared that no experimental evidence had yet been produced in favour of the claim that Much's preparations were superior to other tuberculins, and his "partial antigen laws" were, in Neufeld's opinion, quite "up in the air" and bereft of any scientific foundation. Prof. Uhlenhuth's advice was to the effect that research in chemotherapy should be pursued, as he believed in the possibilities of destroying the tubercle bacillus *in vivo* by chemical agents. On the other hand, the most authoritative speakers adopted a sceptical attitude towards the possibilities of destroying the tubercle bacillus in the body by immuno-biological methods. Perhaps the most useful function of this congress was the opportunity it gave leaders of the medical profession in Germany to chart for the benefit of their colleagues the blind alleys of the problems of tuberculosis.—*The Lancet*, September 3rd, 1921.

World's Poultry Congress.

The transactions of the First World's Poultry Congress held at the Hague, Holland, from the 5th to the 9th September, 1921, have been published in two volumes.

Volume 1.—"Papers and Communications" is divided into four sections, which are as follows:—

(*a*) Experiments, investigations, science of breeding and its practical applications.

(*b*) State and other official action, including reconstruction.

(*c*) Hygiene and disease.

(*d*) The training and necessary qualifications of poultry instructors. Educating and demonstrating work.

Volume 2.—Proceedings of the Congress.

These volumes contain reports on the most recent advances in practical poultry work, poultry education, and in investigations and research into diseases of poultry. They are mostly in the form of papers which were read at the Congress by the delegates from Governments, Research Stations, Universities and Colleges, by members of the more important societies, and by well-known commercial poultry breeders.

This collection of useful and up-to-date information on all poultry matters should prove of considerable value to all engaged in the development of the poultry industry in this country. Universities, Colleges, Farm Institutes and other educational centres, as well as private and commercial poultry keepers, are therefore advised to obtain copies from the office of the Secretary-General of the Poultry Congress, The Hague Holland, price £1 1s. post free.

Third International Congress of the History of Medicine.

The International Society of the History of Medicine was founded in Paris on October 8th, 1921. It has for its object the study of the History of Medicine in all its branches and the co-ordination of research work in these subjects.

A Permanent Committee has been established in Paris, consisting of delegates appointed by sections of the Society in various countries.

The Society meets in congress every three years, and it has been decided to hold the next meeting in London from July 17th to 22nd, 1922. Meetings will be held at the Royal Society of Medicine, the Royal College of Physicians, the Royal College of Surgeons, the Wellcome Historical Medical Museum and elsewhere. There will be special exhibitions of objects connected with the history of medicine, surgery and the allied sciences. The loan of any objects of special interest from members will be greatly appreciated by the Executive Committee.

Communications are invited from members on subjects connected with the history of medicine in all its branches.

The following subjects have been suggested for communication and discussion, but are by no means intended to exclude papers on any subject of general interest in connection with the history of medicine :—

1.—The principal seats of epidemic and endemic diseases in the Occident and Orient in the Middle Ages, including Plague, Gangrenous Ergotism, Leprosy and Malaria.

2.—The History of Anatomy.

3.—The revival of medical knowledge during the 16th century.

Communications should be addressed to: The General Secretary, Dr. J. D. Rolleston, 21 Alexandra Mansions, King's Road, London, S.W.3.

The subscriptions are as follows :—

Members of the International Society of the History of Medicine (including annual subscription)	£1	12	0
Members of the London Congress only	2	0	0
Associate (student or relation of a member)	0	8	0

Remittances for subscriptions by money order or cheque crossed Lloyds Bank should be sent to: The Treasurer, W. G. Spencer, Esq., O.B.E., F.R.C.S., 2 Portland Place, London, W.1.

It is hoped that all veterinary surgeons interested in the history of our science and its literature will make a point of subscribing to the Congress, and of taking part in it. This will be a unique opportunity of bringing the profession before the attention of the public, and of dispelling some of the ignorance which exists as to the work of the profession in the past and its present importance.

Control of Insects.

At the Toronto meeting of the American Association for the Advancement of Science, held during the Christmas holidays, Dr. L. O. Howard, chief entomologist of the United States Department of Agriculture, delivered the presidential address. He was able to make the gratifying announcement that investigations bearing on man's war against insects were now receiving large Government support in the United States. The Federal Government employed a force of 400 trained men, and had equipped and was supporting more than eighty field laboratories scattered over the whole country at centres advantageous for special inquiries. Every State had its own corps of expert workers and investigators. At most of the colleges and universities there were special departments for entomological research and training. And yet he urged that this was only a beginning, and that the human species was still comparatively indifferent to the insect danger. Insects, he reminded his audience—and it is to be hoped that his words will have an even wider influence—stand at the summit of the invertebrate kingdom. In structure and in habits they have become adapted in the most complete fashion to the needs of the species. There is a general recognition that agriculture suffers enormously from them, that diseases carried by them cause a huge loss of human life, and that in many other less-known ways they are working against us. But, according to Dr. Howard, the measures taken against them, even in the United States, are chiefly for immediate relief and are not based on a permanent system. We kill them by chemical warfare, although as yet there are only a few simple and effective insecticides. Army flame-throwers are being used against swarms of locusts and the aeroplane has been employed in reconnaissance against pink bollworm and beetle-damaged timber, or for dusting insecticides over thick forests. In his opinion such direct assaults must be continued and developed, but more intensive study will be required if the final victory is to rest

with man. He attaches great importance to the almost new study of natural control. "If insects would quit fighting amongst themselves," he reports a colleague's picturesque saying, "they would overwhelm the whole vertebrate series." And so he pleads for an intimate and patient study of the life-histories of all insects, with the object of recognising our allies in the insect hosts and concerting measures by which they may be assisted in confounding our enemies.—*The Times.*

Spread of Anthrax.

STERILISING OF IMPORTED BONES.

The Executive Committee of Aberdeen County Council report that they have again directed the attention of the Ministry of Agriculture and Fisheries to recent cases of anthrax upon holdings where crushed bones and bone meal had been used as fertilisers, and reference was made to the correspondence with the Board of Agriculture and Fisheries in 1915 as to the necessity for having all imported bones sterilised with a view to prevent the introduction of anthrax.

In a letter, of date 5th August last, the Ministry state that this question has for some time been under investigation, and that it would appear, from inquiries made in this connection, that the greater proportion of crushed bones and bone meal imported from abroad, although known as raw bones, are submitted to a process for the extraction of fat before exportation from the country of origin, which would have the effect of destroying any anthrax bacilli they may contain, and therefore rendering them innocuous from the point of view of the danger of the importation of anthrax.

The Ministry further state that their inquiries and laboratory experiments on this subject are not, however, completed, and that they are not in a position at the moment to announce the full results.—*Aberdeen Journal.*

"Post-Mortems" at the Zoo.

SCIENTIFIC USE OF DEAD ANIMALS.

Immediately after death the bodies of animals at the Zoological Society's Gardens in Regent's Park are taken to the Prosectorium behind the Reptile House. The first duty of the staff is to ascertain and record the cause of death for the information of a special scientific committee and for the guidance of the curators and the Garden Committee. In many cases the task is simple; in others it requires detailed microscopic examination and the making of cultures of parasitic organisms found in the blood or the tissues. If disease of an infectious character is ascertained or suspected, immediate steps are taken to disinfect the cages or enclosures from which the animals came, and errors of diet or treatment are at once reported.

These practical purposes having been fulfilled, further use of the bodies can often be made. The mammals, except in rare cases when the death has been due to accident, are seldom in a condition fit for mounting as museum specimens, but birds and reptiles may die of disease and yet have their feathers, scales, and colour unfaded. The British Museum (Natural History) is rightly given the first refusal of all bodies belonging to the Society, but they seldom require any except very rare examples. The National Museum of Wales, a young institution now in process of building up a representative collection, is still glad of material of almost any kind. The anatomical department at Cambridge takes a regular supply of bodies suitable for dissection by students. The Museum of the Royal College of Surgeons draws on the Prosectorium for internal organs for the Hunterian series of comparative anatomy and for examples of special pathological interest.

The Society's anatomist, pathologist, and parasitologist, all highly qualified young men, are continually engaged on special researches for which they have first choice of the necessary material. Even when their wants are fully met, a large quantity of material remains. Some of it is preserved for future use; much goes to persons connected with other institutions who require it.

The Zoological Society is not a teaching body, and there is always a danger that investigators, isolated in a laboratory and deprived of the stimulus given by pupils, may become narrow in their outlook. This has been prevented by a fortunate co-operation between the Prosectorium and departments of the University of London.—*The Times.*

Experimental Production of Tar Cancer.

The work of several Japanese experimenters, who produced carcinomas in rabbits and in mice by painting the skin with tar for long periods of time has been fully confirmed by Professor Fibiger, of Copenhagen. Of thirty mice painted with tar for 103 days or longer, no fewer than twenty-four developed carcinomatous growths. That these are true malignant neoplasms is shown by the fact that in several of them secondary growths were observed in the lungs or in the lymph glands, and in others the tumours were successfully inoculated into other mice for repeated generations. Furthermore, the carcinoma continued to grow in many of these animals after the painting with tar was stopped. The observations established positively that the continued irritation of tissues by a chemical agent, characterised by stimulating the cells to proliferation, can of itself lead to the production of true malignant neoplasms. There is thus experimental evidence to show that many different things may lead to the production of cancer. These exciting agents have in common merely their capacity to stimulate tissue growth. Presumably cancer cannot be due to one single identical cause, such as a specific cancer parasite. but several or numerous factors of different origin and different nature may be active in exciting the epithelial cells to unlimited carcinomatous proliferation.—*Journ. Amer. Med. Assoc.*, July 9th, 1921, p. 127.

Scientific Research.

PROPOSED WORLD LIST OF PERIODICALS.

A circular letter has been issued by the Conjoint Board of Scientific Societies to the leading libraries, scientific institutions, and similar bodies in this country, describing a scheme for the publication, if sufficient support be obtained, of a list of all the periodicals in every country which publish the results of scientific research. There are many thousands of these, and an indication will be given of some of the chief centres in Great Britain and Ireland where the periodicals may be consulted. The Trustees of the British Museum have consented to allow the work of compilation to be undertaken by their staff, so that the authenticity of the list is assured.

The list will be an octavo volume, price £2 2s., containing in alphabetical order the titles and places of publication of all such periodicals in existence on January 1st, 1900, and of all issued after that date. Libraries in London, Oxford, Cambridge, Edinburgh, Dublin, and Aberystwyth which take in these periodicals will be indicated in the list, and, wherever possible, at least one library in the United Kingdom will be indicated for each title. Copies will be printed on one side only to facilitate alterations and additions. One of the objects of the proposed volume is to form a basis for co-operation between libraries, so that both the number of duplicates and the list of periodicals not taken in may be reduced.

It is scarcely possible (states the circular) that the production of so costly a work would be entertained by a publishing firm as an ordinary commercial enterprise. If, however, a sufficient number of libraries and institutions agree in advance to purchase one or more copies when issued, the compilation of the list will be put in hand at once.

Great Strength in Tiny Bodies.

Probably the most wonderful feature of a mosquito is its muscularity. This may seem a ludicrous statement, but a great surprise awaits anyone who for the first time examines one of these insects under a glass. Size for size, a mosquito's wing muscles are equal to an eagle's. Even on a calm day, a mosquito can fly forty or fifty miles without a halt; and with a helping wind, three times this distance. The ordinary house-fly, too, has astonishing wing strength; tests have been shown that when it desires really to hurry it can "dash" 160 feet in a second—110 miles an hour straight-away.

Imagine a man who could lift 73,800 pounds. He would have all known "strong men" of past and present beaten so far that comparisons would be ridiculous. But that is what our average man could lift were he as strong in proportion to his size as a crab; a weight 490 times its own is just a good average lift for a crab. The muscles of a large oyster, too, will support a weight of thirty-seven pounds.

A Belgian scientist found that a bee, weight for weight, was thirty times as strong as a horse. It has been found that an ordinary house-fly can lift a match-stick, and that in doing so it exerts as much power in proportion to its size as a man when he holds aloft on his feet a beam fourteen feet long by thirty inches square. Even a very small bug can drag six matches—the equivalent to a man's pulling 330 beams as large as himself.

Spiders sometimes exhibit wonderful strength, especially in conflict. There is a spider in Java that is the dread of all other insects; it makes a web that can hardly be cut with a knife. With spiders size is not always a measure of strength; but this fellow has both bulk and power.

One writer states that an ordinary ant can carry ten times its own weight. Personally, I have seen them do far more than this.—L. E. EUBANKS, in *Canadian Veterinary Record*.

Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

Period.	Rabies. Cases Confirmed. Dogs.	Rabies. Cases Confirmed. Other Animals.	Anthrax. Outbreaks confirmed.	Anthrax. Animals attacked.	Foot-and-Mouth Disease. Outbreaks confirmed.	Foot-and-Mouth Disease. Animals slaughtered as diseased or exposed to infection.	Glanders (including Farcy).* Outbreaks reported by the Local Authorities.	Glanders (including Farcy).* Animals attacked.	Parasitic Mange. Outbreaks reported by the Local Authorities.	Parasitic Mange. Animals attacked.	Sheep Scab. Outbreaks reported by the Local Authorities.	Swine Fever. Outbreaks confirmed.	Swine Fever. Swine slaughtered as diseased or exposed to infection
GT. BRITAIN.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Week ended 4th February, 1922	...	...	8	10	268	...	...	...	50	76	39	13	2
Corresponding Week in 1921	1	...	20	1	...	144	...	...	107	156	39	20	4
Corresponding Week in 1920	...	...	8	8	6	253	...	...	189	360	29	38	14
Corresponding Week in 1919	1	...	6	6	...	165	...	...	152	331	20	17	4
Total for 5 weeks, 1922 ...	...	...	53	58	300	...	...	...	251	408	222	123	42
Corresponding period in 1921	10	1	83	101	21	2143	...	...	483	769	180	132	33
Corresponding period in 1920	2	...	43	50	24	1277	3	6	837	1582	140	223	82
Corresponding period in 1919	15	1	23	24	12	744	...	...	868	1885	103	89	34
IRELAND.													
Week ended 4th February, 1922	...	...	...	...	...	...	...	...	Outbreaks 8	2	6	17	
Corresponding Week in 1921 ...	...	...	...	...	21	...	...		15	2	20		
Corresponding Week in 1920 ...	...	...	...	...	...	1	2	4	15	1	2		
Corresponding Week in 1919 ...	...	...	...	...	...	...	...	2	14	...	...		
Total for 5 weeks, 1922	...	...	...	...	...	...	...	...	30	21	35	160	
Corresponding period in 1921 ...	...	...	1	35	...	...	14	59	5	37			
Corresponding period in 1920 ...	...	...	...	...	1	2	21	51	1	4			
Corresponding period in 1919 ...	...	...	...	...	...	...	11	71	5	13			

NOTE.—The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

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